How Effective is Aggressive Portfolio Management?

Mutual Fund Performance in Canada, 1985 - 1996

By George Athanassakos, Peter Carayannopoulos, and Marie Racine

A look at mutual fund performance between 1985 and 1996 suggests that professional portfolio managers cannot consistently beat the market. While some managers do occasionally outperform the market, our evidence suggests that during this period it does not happen on a consistent basis over the long run. Given the significant management fees funds are charging, this finding is relevant to all investors. It is especially true, however, for institutional investors who are searching for returns in difficult markets and asking themselves whether aggressive management is the answer.

The objective of this paper is threefold. First, the paper attempts to evaluate the performance of Canadian mutual funds between 1985 and 1996. An extended version of the Treynor-Mazuy model is used to assess the market-timing and stock-selection abilities of mutual fund managers for the aforementioned period. The model allows for the inclusion of non-TSE 300 assets in mutual fund portfolios. Furthermore, our results are free of survivorship bias since dead funds are included in the sample of mutual funds examined.[1] The period of the study (1985 to 1996) is the most recent one examined by any Canadian mutual funds study. Second, the paper purports to study the consistency of performance of Canadian mutual funds and attempts to answer the question of whether historic mutual fund performance can be used as a predictor of future performance. Finally, the third objective of the paper is to compare the performance of dead and surviving mutual funds and answer the question of whether survivorship bias is an important bias to control for in performance measurement studies of mutual funds.

Literature Review

Mutual fund performance has received considerable attention in the U.S. market and numerous studies covering a variety of periods exist. These studies usually examine a manager's selectivity ability, i.e., his/her ability to select "winners," and/or a manager's ability to time the market correctly, i.e., timing ability. Ippolito (1993), Eun, Kolodny, and Resnick (1991), Elton, Gruber, Das and Hlavka (1993), and Brown and Goetzmann (1995) find no support for fund managers' superior performance. In contrast, Bello and Janjigian (1997) find positive and significant selectivity

George Athanassakos is a professor of finance and director of the Financial Planning program at the School of Business and Economics, Wilfrid Laurier University, Waterloo. Peter Carayannopoulos is chair of insurance and an associate professor of finance at the School of Business and Economics, Wilfrid Laurier University, Waterloo. Marie Racine is an associate professor of economics at the Department of Finance and Management Science, University of Saskatchewan, Saskatoon.

and market-timing abilities for 633 mutual funds during the 1984-94 period. Finally, Daniel, Grinblatt, Titman and Wermers (1997) suggest that mutual funds, particularly aggressive-growth funds, exhibit some selectivity ability, but no market-timing ability.

Within the Canadian environment, findings such as those of Calvet and Lefoll (1980), Martel, Khoury and M'zali (1987) and Bishara (1988) overwhelmingly suggest the absence of mutual funds' superior performance. Kryzanowski, Lalancette and To (1994) assess both the stock-picking and market-timing capabilities of Canadian mutual fund managers over the period from June 1981 to December 1988. Their findings suggest significantly negative stock-picking and market-timing abilities for Canadian mutual fund managers.

The Model

A model widely used in mutual fund studies to assess both selectivity and market-timing performance is the following quadratic Treynor-Mazuy (TM) model:

$$r_{pt} = a_p + b_1 r_{mt} + b_2 r_{mt}^2 + e_{pt}, \quad (1)$$

where

r_{pt} = the excess return on portfolio p over the risk-free rate during period t,

a_p = estimated selectivity performance,

b_1 = the portfolio's estimate of systematic risk,

r_{mt} = excess return of the market portfolio over the risk-free rate during period t,

b_2 = estimated indicator of market-timing performance,

e_{pt} = residual excess return on portfolio p during period t.

Treynor and Mazuy (1966) argued that while a positive value for a_p suggests selectivity ability, a positive value for b_2 is indicative of market-timing ability since this term allows the characteristic line to become steeper as excess returns on the market portfolio get larger. A negative value for b_2 is interpreted as a lack of ability of fund managers to time the market correctly. An insignificant value for b_2 can be interpreted either as a lack of timing ability or as no attempt by a fund manager to time the market as is the case in a buy and hold strategy. Admati, Bhattacharya, Pfleiderer and Ross (1986) show that this simple quadratic regression model is a valid measure of market-timing performance and can be used to identify fully the quality of timing information and to detect the existence of selectivity information.

Traditionally, a significant portion of Canadian equity mutual funds is invested in corporate and government bonds, as well as near-cash securities.[2] During bull markets, performance is adversely affected when a significant portion of the mutual fund is invested in near-cash securities. The opposite is true during bear markets. To account for the effects of bonds and cash equivalents on mutual fund performance, an extended version of the TM model (ETM) is used with the Scotia McLeod universe bond index and the Scotia McLeod 30-day corporate paper index being added as explanatory variables in equation (1):[3]

$$r_{pt} = a_p + b_1 r_{mt} + b_2 r_{mt}^2 + b_3 r_{bond,t} + b_4 r_{corp,t} + e_{pt}, \quad (2)$$

where

r_{mt} = excess return on the Canadian Financial Markets Research Centre (CFMRC) value-weighted stock index, a broad index that includes the universe of Canadian stocks,

$r_{bond,t}$ = excess return on the Scotia McLeod universe bond index,

$r_{bond,t}$ = excess return on the Scotia McLeod 30-day corporate paper.

Data

The study examines the performance of Canadian Mutual funds during the period from January 1985 to December 1996. Unreliability of data prior to 1985 dictates the starting time for the period considered. The overall period was divided in three four-year non-overlapping sub-periods: January 1985 to December 1988, January 1989 to December 1992 and January 1993 to December 1996. The division of the overall period into the three sub-periods is thus implemented in order to test stability and consistency of mutual fund performance and to investigate whether past performance can be used as a basis for forecasting future performance. Furthermore, the division allows us to include, in a given period, mutual funds that may have "died" during subsequent periods, something that is expected to mitigate the effects of survivorship bias.

Monthly returns for each sub-period are extracted for all mutual funds included in the *Financial Post* mutual fund database. The database is adjusted to include dead funds.[4] For statistical reasons, a fund had to have at least 36 (out of the possible 48) observations during the specific four-year period in order to be included in the sample. Due to data (and fund) limitations, only equity, balanced, dividend and resource funds are examined among all equity-based funds reported in the *Financial Post* database. The result is a sample containing 141, 257 and 302 funds in each of the first, second and third sub-periods referred to above, respectively. Only 127 funds

have had observations for the entire 1985-1996 period.

The 30-day Treasury bill rate, as a proxy for the risk-free rate, and monthly returns on the value-weighted index of all Canadian stocks were also extracted from the CFMRC data base. The Scotia McLeod bond universe and corporate paper index monthly returns were extracted from the Scotia McLeod's Handbook of Canadian Debt Market Indices publication.

Mutual Fund Performance

In addition to each category of funds (equity, balanced, dividend, and resource) and in order to address the effect management style (aggressive versus conservative) has on performance, the equity funds group is divided into four groups according to a fund's beta (b_1) value. Equity (Eq.) #1 contains the less aggressive funds (lowest beta funds), while Eq. #4 contains the most aggressive funds (highest beta funds). Performance results are discussed separately for each category.

Table 1 reports average values for the estimates of a_p and b_2, the regression coefficients associated with selectivity and market-timing performance respectively. Numbers in parentheses denote *t*-values for the averaged coefficients. Table 2 (see page 45) reports the number of funds in each category with positive coefficient estimates (the number of negative estimates can easily be inferred). The first number in parentheses denotes the number of funds with a positive and significant estimate for each coefficient, while the second number in parentheses denotes the number of funds with a negative and significant estimate for each coefficient. Results for each of the three sub-periods considered are presented in each of the two tables.

A careful analysis of the results in Tables 1 and 2 suggests that, in general, equity funds have exhibited selectivity abilities only during the last of the three time-periods considered. Furthermore, the ability to select funds that outperform the market index was constrained to the aggressive equity group. It should be noted that this period was generally characterized by good economic conditions and rising markets. There was no evidence to support positive market-timing ability for equity funds in any of the three periods. Similarly, balanced funds demonstrated no evidence of selectivity or market-timing abilities. From 1985 to 1988, dividend funds overall exhibited positive (but insignificant) selectivity performance, but only four of the ten funds analyzed had a positive

TABLE 1

SELECTIVITY AND MARKET-TIMING PERFORMANCE RESULTS

	JAN. 1985 - DEC. 1988			JAN. 1989 - DEC. 1992			JAN. 1993 - DEC. 1996		
	# of funds	a_p	b_2	# of funds	a_p	b_2	# of funds	a_p	b_2
Eq. #1	23	.1893 (2.19)	-.0078 (-3.77)	33	-.3450 (-3.07)	-.0026 (-1.02)	39	.1087 (1.22)	-.0040 (-1.05)
Eq. #2	23	-.1438 (-2.29)	-.0055 (-4.38)	33	-.0844 (-1.18)	-.0017 (-.62)	39	-.1414 (-1.97)	.0010 (.51)
Eq. #3	23	-.1970 (-2.42)	-.0024 (-1.92)	33	-.0236 (-.27)	-.0031 (-1.47)	39	.0832 (.77)	-.0191 (-4.75)
Eq. #4	22	-.1983 (-2.39)	-.0002 (-.11)	31	.2427 (1.24)	-.0030 (-.85)	39	.7750 (4.90)	-.0516 (-8.95)
Tot.Eq	91	-.0862 (-2.04)	-.0040 (-4.90)	130	-.0571 (-.90)	-.0026 (-1.90)	156	.2064 (3.35)	-.0184 (-7.04)
Bal.	33	-.0608 (-1.24)	-.0036 (-3.65)	98	-.0268 (-.67)	-.0044 (-4.62)	111	-.1327 (-2.96)	-.0006 (-.48)
Div.	10	.1292 (1.24)	-.0013 (-1.03)	18	-.2825 (-2.30)	-.0128 (-2.67)	22	.3093 (6.54)	.0007 (.25)
Res.	7	.4829 (2.05)	.0071 (1.57)	11	1.2868 (2.48)	.0069 (1.38)	13	.7649 (1.86)	-.0826 (-4.70)

The regression model is $r_{pt} = a_p + b_1 r_{mt} + b_2 r_{mt}^2 + b_3 r_{bond,t} + b_4 r_{corp,t} + e_{pt}$, where r_{pt} is the excess return on portfolio p over the risk-free rate during period t, r_{mt} is the excess return on the CFMRC value-weighted stock index, $r_{bond,t}$ is the excess return on the Scotia McLeod universe bond index, $r_{corp,t}$ is the excess return on the Scotia McLeod 30-day corporate paper and e_{pt} is the residual excess return on portfolio p during period t. The regression model is run for each mutual fund in the sample. Regression coefficients presented are the averages over all funds in each designated group (or type). Numbers in parentheses denote *t*-statistics [t = (average of the coefficients)/(standard error of the average)].

estimate (none significant). Negative (though insignificant) market-timing ability was found during the same period. Overall, the 18 dividend funds examined in this paper between 1989 and 1992 exhibited significantly negative selectivity and market-timing abilities. Dividend funds exhibited significant selectivity performance from 1993 to 1996. Marginal selectivity performance was exhibited during 1985-1988. Market-timing ability was positive (but not significant) from 1993 to 1996, but negative from 1985 to 1988 and from 1989 to 1992. Finally, our results suggest consistent selectivity performance in resource funds, unlike the other categories of funds analyzed (significant selectivity ability from 1985 to 1988 and from 1989 to 1992 and marginal selectivity ability from 1993 to 1996). The results, however, indicate that resource funds exhibited no market-timing ability (positive, though insignificant, market-timing ability during the first two periods but significantly negative ability during the third period).

Consistency of Performance

The results presented, thus far, consider both the surviving and dead funds. To examine the consistency of the funds that were alive during all 3 periods, the number of surviving mutual funds that exhibited either selectivity ability or market-timing ability or both in all 3 sub-periods is examined. The results are reported in Table 3 (see page 47). In all, 127 mutual funds were alive during all the three sub-periods considered: 82 equity, 28 balanced, 10 dividend, and 7 resource funds.[5] Of the equity funds only 9 (10.98 per cent) demonstrated selectivity ability in all three sub-periods. The corresponding numbers for balanced, dividend, and resource funds were 1 (3.57 per cent), 2 (20 per cent), and 3 (42.86 per cent), respectively. In total, 15 (11.81 per cent) of the funds considered demonstrated some selectivity ability in all three sub-periods. With respect to consistency of timing ability, the results were even worse. In total, 6 mutual funds (4.72 per cent) demonstrated some timing ability in all three sub-periods. No funds demonstrated both selectivity and timing ability consistently in all three sub-periods. Therefore, based on the evidence presented in this section, little can be concluded about the question of whether historic performance implies similar performance in the future.

Survivorship Bias

In empirical studies, the properties of the sample studied are of the utmost importance. In particular, all previous Canadian mutual fund performance studies have been

TABLE 2

SELECTIVITY AND MARKET-TIMING PERFORMANCE RESULTS

	JAN. 1985 - DEC. 1988			JAN. 1989 - DEC. 1992			JAN. 1993 - DEC. 1996		
	# of funds	a_p	b_2	# of funds	a_p	b_2	# of funds	a_p	b_2
EQ. #1	23	13 (0, 1)	5 (1, 4)	33	12 (1, 2)	13 (1, 2)	39	22 (1,1)	22 (1,8)
EQ. #2	23	6 (1, 0)	5 (3, 0)	33	16 (1, 2)	9 (3, 0)	39	11 (0, 1)	22 (0, 3)
EQ. #3	23	6 (0, 1)	7 (1, 6)	33	20 (0, 2)	9 (0, 2)	39	14 (2, 1)	7 (1, 5)
EQ. #4	22	5 (0, 0)	8 (1, 8)	31	17 (0, 1)	11 (3, 1)	39	32 (1, 2)	0 (0, 5)
TOT.EQ	91	30 (1, 2)	25 (6,17)	130	65 (2, 7)	42 (7, 5)	156	79 (4, 5)	51 (2,21)
BAL.	33	12 (0, 2)	9 (0, 9)	98	48 (1, 5)	29 (3,10)	111	26 (1,11)	53 (2, 6)
DIV.	10	4 (0, 0)	1 (1, 0)	18	6 (0, 1)	2 (1, 9)	22	20 (1, 1)	12 (2, 1)
RES.	7	5 (0, 0)	6 (1, 1)	11	10 (2, 0)	8 (0, 0)	13	9 (0, 0)	0 (0, 2)

The regression model is run for each mutual fund in the sample. The table depicts the number of funds with a positive estimate for each coefficient (# of funds minus the depicted number denotes the number of funds with a negative coefficient). The first number in parentheses denotes the number of funds with a positive and significant estimate for each coefficient, while the second number in parentheses denotes the number of funds with a negative and significant estimate for each coefficient.

TABLE 3

PERSISTENCE OF SELECTIVITY AND TIMING ABILITY ACROSS ALL THREE SUB-PERIODS

FUND TYPE	# of funds alive in all three sub-periods	# of funds with positive a_p in all three sub-periods	# of funds with positive b_2 in all three sub-periods	# of funds with positive a_p *and* b_2 in all three sub-periods
Equity	82	9	4	0
Balanced	28	1	1	0
Dividend	10	2	1	0
Resource	7	3	0	0
Total	**127**	**15**	**6**	**0**

The regression model is run for each mutual fund in the sample. The three sub-periods are as follows: Jan. 1985 to Dec. 1988, Jan. 1989 to Dec. 1992, and Jan. 1993 to Dec. 1996. Positive *ap* denotes the existence of selectivity ability, while positive b_2 denotes the existence of timing ability.

TABLE 4

A COMPARISON OF SELECTIVITY AND MARKET-TIMING ABILITIES BETWEEN LIVE AND DEAD FUNDS

	LIVE FUNDS			DEAD FUNDS		
	# of funds	# of funds with a_p>0	# of funds with b_2>0	# of funds	# of funds with a_p>0	# of funds with b_2>0
Equity	152	60 (7)	47 (7)	11	1 (0)	5 (1)
Balanced	108	37 (0)	47 (8)	17	5 (0)	7 (3)
Dividend	22	16 (2)	8 (2)	1	0 (0)	0 (0)
Resource	13	10 (2)	7 (1)	1	1 (0)	0 (0)
Total	**295**	**123 (11)**	**109 (18)**	**30**	**7 (0)**	**12 (4)**

The regression model is run for each mutual fund in the sample for the period from Jan. 1985 to Dec. 1996 (or for a smaller period if either the inception date of a fund was later than Jan. 1985 or the fund died before Dec. 1996 or both, provided that the fund has at least 36 observations). Numbers in parentheses denote positive and significant at the .05 level.

exposed to what is known as survivorship bias, i.e., the exclusion from the sample of funds that ceased to exist at some point before the end of the study period.

In this section, the performance of the dead funds is compared to the performance of the funds that survived over our total sample period. Regression (2) is run for each fund in our sample and for the period starting either in January 1985 or at the inception of the fund (whichever is later) and ending in December 1996 or at the point in time the fund ceased to exist (whichever is earlier). An additional requirement is that the fund has at least 36 observations. Thus, performance for each fund is analyzed for its entire life within the January 1985 to December 1996 period. The results are reported in Table 4. Out of the 152 alive equity funds, 60 (or 39.47 per cent) exhibited some selectivity ability. For seven of these funds (or 4.61 per cent) the selectivity coefficient, *ap*, was significantly higher than zero. In contrast, only one of the eleven dead funds (or 9.09 per cent) exhibited some selectivity ability (although the coefficient was not significantly higher than zero). With respect to timing ability, for 47 out of the 152 alive equity funds (or 30.92 per cent), the coefficient associated with timing ability (b_2) had a positive value (in seven cases, or 4.61 per cent, the coefficient was also significant). Interestingly, the number of dead funds demonstrating some timing ability (five out of 11 or 45.45 per cent) was higher than the experience for alive funds. With respect to balanced funds, 37 out of 108 live funds (34.26 per cent), and five out of 17 dead funds (29.41 per cent) experienced some selectivity ability

(although the number of significantly positive coefficients in either case was zero). Market-timing ability was detected in 47 out of 108 (43.52 per cent) and in seven out of 17 (41.18 per cent) of the alive and dead funds respectively. It is evident from these results that dead funds, in general, possess poor selectivity ability to a greater extent than alive funds, particularly for equity funds, while market-timing ability is not substantially different between the two groups.[6] A comparison of the performance of live and dead funds in the dividend and resource sectors is not possible due to an insufficient number of dead funds.[7, 8]

Conclusion

This study's evidence suggests that Canadian mutual funds, in general, have not demonstrated any consistent stock-picking or market-timing abilities during the study period, with the possible exception of resource funds. Moreover, past performance is not found to have any predictive ability for a fund's future performance.

Furthermore, our results demonstrate that the exclusion of dead funds from a sample introduces survivorship bias, since, on average, dead funds are characterized by a lack of stock-picking ability to a greater extent than alive (or surviving) funds, and this leads to dead funds having lower returns than alive funds. Hence, omitting dead funds from mutual fund performance studies can potentially bias the results upwards, presenting a more favourable picture for mutual fund performance than warranted. ▮

Acknowledgments

We would like to thank Emil Hallin and Ian Lobbo. Their help in managing the data is greatly appreciated. Funding for this project was provided by a Wilfrid Laurier University Short-Term Research Grant.

Endnotes

1. The term dead fund is used to refer to a fund that ceased to exist at some point in time after its inception. The term alive (or surviving) fund refers to a fund which continued to exist over the time period examined by this study.
2. According to the June 1989 Investment Fund Institute of Canada publication, Canadian equity mutual funds hold approximately 25% of their assets in government and corporate bonds and short-term commercial paper and notes.
3. A similar argument was made by Elton et al (1993), who used a non-S&P equity index, in addition to the S&P 500, as well as a bond index, and Bello and Janjigian (1997) who used the Wilshire 4500 and Shearson-Lehman Government/Corporate Bond indexes.
4. Some survivorship bias may still exist if a fund "died" early during the 4-year period and, thus, did not meet the criterion of having at least 36 observations during this time.
5. By construction, the sample used in the tests reported in this section excludes mutual funds with inception dates after the first sub-period.
6. The percentage of live balanced funds that experienced some selectivity ability is higher than the dead balanced funds, but not by as much as one would have expected. The reason may be that not all funds that are included in our dead funds sample have disappeared due to bad performance. Some funds disappeared because they were merged with other funds when two mutual fund companies merged. Unfortunately, due to the way that the dead funds database is structured it is impossible to identify the cause of disappearance.
7. The average monthly return for the 152 alive equity funds examined in the paper was 0.92 per cent compared with 0.73 per cent for the 11 dead funds analyzed. The corresponding numbers for the 108 alive and 17 dead balanced funds were 0.82 per cent and 0.67 per cent respectively. Mean differences were statistically significant in both cases.
8. We also estimated equation (1), as well as a model developed by Henriksson and Merton (HM, 1981) to test the robustness of the findings to different model specifications. The main difference between the TM and the HM models is that while they are both trying to capture non-linearities in the data, the TM does it through the r_{mt}^2 term, while the HM model replaces r_{mt}^2 term with a constructed variable 'y', defined as the max (0, - r_{mt}^2). Our findings from running the TM and HM models show that changing model specification from ETM to TM or HM has had no impact on the measurement of the market timing ability (beta coefficient) of mutual funds and has had only minor impact on the selectivity coefficient (alpha). These results are not reported here, but are available from the authors upon request.

References

Admati, A. R., S. Bhattacharya, P. Pfleiderer and S. A. Ross (1986). On Timing and Selectivity. *Journal of Finance*, 41(3), 715-732.

Bello, Z. Y. And V. Janjigian (1997). A Re-examination of the Market-Timing and Security-Selection Performance of Mutual Funds. *Financial Analysts Journal*, 53, 24-30.

Bishara, H. (1988). Evaluation of the Performance of Canadian Mutual Funds (1967-1984). Finance Proceedings, Administrative Sciences Association of Canada, vol. 9.

Brown, S. J. and W. N. Goetzmann (1995). Performance Persistence. *Journal of Finance*, 50(2), 679-98.

Calvet, A. L. And J. Lefoll (1988). Risk and Return in Canadian Capital Markets. *Canadian Journal of Administrative Sciences*, 5, 1-12.

Daniel, K., M. Grinblatt, S. Titman and R. Wermers (1997). Measuring Mutual Fund Performance with Characteristic-Based Benchmarks. *Journal of Finance*,, 52(3), 1035-1058.

Elton, E. J., M. J. Gruber. S. Das and M. Hlavka (1993). Efficiency with Costly Information: A Reinterpretation of Evidence from Managed Portfolios. *Review of Financial Studies*, 6(1), 1-22.

Eun, C. S., R. Kolodny and B. G. Resnick (1991). U.S. Based International Mutual Funds: A Performance Evaluation. *Journal of Portfolio Management*, 17(3), 88-94.

Henriksson, R. D. and R. Merton (1981). On Market Timing and Investment Performance: Statistical Procedures for Evaluating Forecasting Skills. *Journal of Business*, 54, 513-533.

Ippolito, R. A. (1993). On Studies of Mutual Fund Performance, 1962-1991. *Financial Analysts Journal*, 49(1), 42-50.

Kryzanowski, L., S. Lalancette and M. C. To (1994). Performance Attribution Using a Multivariate Inter-temporal Asset pricing model with One State variable. *Canadian Journal of Administrative Sciences*, 11(1), 75-85.

Martel, J., N. Khoury and B. M'zali (1987). Relationship between Mutual Funds Size and Their Performance. Finance Proceedings, Administrative Sciences Association of Canada, vol. 8.

Treynor, J. L. and K. Mazuy (1966). Can Mutual Funds Outguess the Market? *Harvard Business Review*, 44, 131-136.